

# Getting and building Fluidity

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# Outline

About today

Getting Fluidity

Configuring and building

Installing

Installing

Updating

## Today...

...we will learn how to:

- ▶ Build Fluidity
- ▶ Make a mesh
- ▶ Set up a Fluidity simulation
- ▶ Run a Fluidity simulation
- ▶ Look at the output
- ▶ Run Fluidity in parallel

## Where to get Fluidity

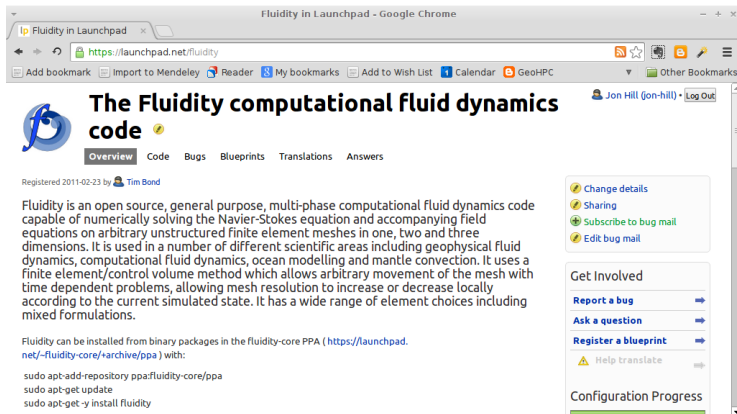
- ▶ Prebuilt Debian package
- ▶ Bzr
- ▶ Source code archives (.tgz)

Important information in the Fluidity manual

## Bzr

```
cd /data/  
mkdir <username>  
cd <username>  
  
bzr co lp:fluidity
```

# Launchpad



The screenshot shows a web browser window titled "Fluidity in Launchpad - Google Chrome". The address bar shows the URL "https://launchpad.net/fluidity". The page content includes the Launchpad logo, the title "The Fluidity computational fluid dynamics code", and a list of navigation links: Overview, Code, Bugs, Blueprints, Translations, and Answers. The "Overview" tab is selected. The text describes Fluidity as an open source, general purpose, multi-phase computational fluid dynamics code capable of numerically solving the Navier-Stokes equation and accompanying field equations on arbitrary unstructured finite element meshes in one, two and three dimensions. It is used in a number of different scientific areas including geophysical fluid dynamics, computational fluid dynamics, ocean modelling and mantle convection. It uses a finite element/control volume method which allows arbitrary movement of the mesh with time dependent problems, allowing mesh resolution to increase or decrease locally according to the current simulated state. It has a wide range of element choices including mixed formulations. Below the text, it states that Fluidity can be installed from binary packages in the fluidity-core PPA (https://launchpad.net/~fluidity-core/+archive/ppa) with the following commands: 

```
sudo apt-add-repository ppa:fluidity-core/ppa
sudo apt-get update
sudo apt-get -y install fluidity
```

 On the right side, there are sections for "Get Involved" with links for "Change details", "Sharing", "Subscribe to bug mail", "Edit bug mail", "Report a bug", "Ask a question", "Register a blueprint", and "Help translate". There is also a "Configuration Progress" section with a green progress bar.

Fluidity in Launchpad - Google Chrome

https://launchpad.net/fluidity

Add bookmark Import to Mendeley Reader My bookmarks Add to Wish List Calendar GeoHPC

Jon Hill (jon-hill) Log Out

## The Fluidity computational fluid dynamics code

Overview Code Bugs Blueprints Translations Answers

Registered 2011-02-23 by Tim Bond

Fluidity is an open source, general purpose, multi-phase computational fluid dynamics code capable of numerically solving the Navier-Stokes equation and accompanying field equations on arbitrary unstructured finite element meshes in one, two and three dimensions. It is used in a number of different scientific areas including geophysical fluid dynamics, computational fluid dynamics, ocean modelling and mantle convection. It uses a finite element/control volume method which allows arbitrary movement of the mesh with time dependent problems, allowing mesh resolution to increase or decrease locally according to the current simulated state. It has a wide range of element choices including mixed formulations.

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Change details  
Sharing  
Subscribe to bug mail  
Edit bug mail

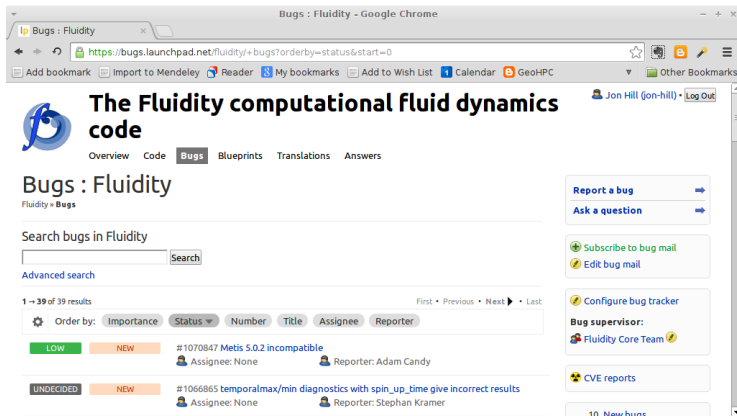
Get Involved

Report a bug  
Ask a question  
Register a blueprint  
Help translate

Configuration Progress

<http://launchpad.net/fluidity>

# Launchpad



The screenshot shows a web browser window titled "Bugs : Fluidity - Google Chrome". The address bar shows the URL "https://bugs.launchpad.net/fluidity/+bugs?orderby=status&start=0". The page header includes navigation links: "Overview", "Code", "Bugs" (active), "Blueprints", "Translations", and "Answers". The main heading is "The Fluidity computational fluid dynamics code". Below this is a search bar with the text "Search bugs in Fluidity" and a "Search" button. To the right of the search bar are links for "Report a bug", "Ask a question", "Subscribe to bug mail", "Edit bug mail", "Configure bug tracker", "Bug supervisor: Fluidity Core Team", and "CVE reports". The main content area displays a list of bugs. The first bug is "#1070847 Metis 5.0.2 incompatible" with a status of "NEW" and a reporter of "Adam Candy". The second bug is "#1066865 temporalmax/min diagnostics with spin\_up\_time give incorrect results" with a status of "NEW" and a reporter of "Stephan Kramer".

Bugs : Fluidity

Fluidity » Bugs

Search bugs in Fluidity

Advanced search

1 → 39 of 39 results

Order by: Importance Status Number Title Assignee Reporter

LOW NEW #1070847 Metis 5.0.2 incompatible

Assignee: None Reporter: Adam Candy

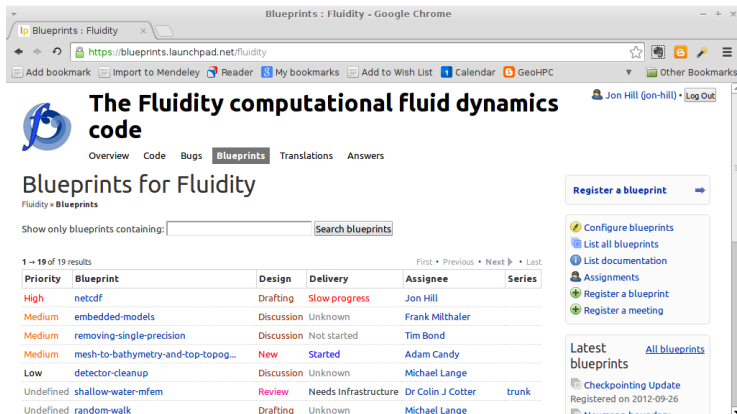
UNDECIDED NEW #1066865 temporalmax/min diagnostics with spin\_up\_time give incorrect results

Assignee: None Reporter: Stephan Kramer

10 New bugs

<http://launchpad.net/fluidity>

# Launchpad



The screenshot shows a web browser window titled "Blueprints : Fluidity - Google Chrome" with the URL "https://blueprints.launchpad.net/fluidity". The page header includes the Fluidity logo and the title "The Fluidity computational fluid dynamics code". Navigation links include Overview, Code, Bugs, Blueprints (selected), Translations, and Answers. A search bar is present with the text "Show only blueprints containing:". Below this, a table lists 19 results, showing the first 7. The table has columns for Priority, Blueprint, Design, Delivery, Assignee, and Series.

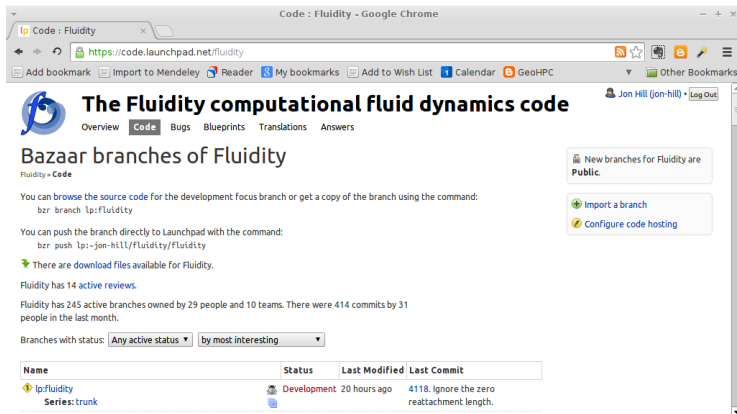
Priority	Blueprint	Design	Delivery	Assignee	Series
High	netcdf	Drafting	Slow progress	Jon Hill	
Medium	embedded-models	Discussion	Unknown	Frank Mithaler	
Medium	removing-single-precision	Discussion	Not started	Tim Bond	
Medium	mesh-to-bathymetry-and-top-topog...	New	Started	Adam Candy	
Low	detector-cleanup	Discussion	Unknown	Michael Lange	
Undefined	shallow-water-mfem	Review	Needs Infrastructure	Dr Colin J Cotter	trunk
Undefined	random-walk	Drafting	Unknown	Michael Lange	

On the right side of the page, there is a sidebar with a "Register a blueprint" button and a list of actions: Configure blueprints, List all blueprints, List documentation, Assignments, Register a blueprint, and Register a meeting. Below this is a "Latest blueprints" section with links to "Checkpointing Update" and "Neumann boundary".

<http://launchpad.net/fluidity>



# Launchpad



The screenshot shows a web browser window titled "Code : Fluidity - Google Chrome" displaying the Launchpad page for "The Fluidity computational fluid dynamics code". The page has a navigation bar with links: Overview, Code (selected), Bugs, Blueprints, Translations, and Answers. The main heading is "Bazaar branches of Fluidity". Below this, there are instructions on how to browse the source code and push a branch directly to Launchpad, along with terminal commands: `bzr branch lp:fluidity` and `bzr push lp:~jon-hill/fluidity/fluidity`. A sidebar on the right contains links for "New branches for Fluidity are Public", "Import a branch", and "Configure code hosting". The main content area also mentions "14 active reviews" and "245 active branches owned by 29 people and 10 teams". At the bottom, there is a table of branches with columns: Name, Status, Last Modified, and Last Commit.

Name	Status	Last Modified	Last Commit
lp:fluidity Series: trunk	Development	20 hours ago	4118. Ignore the zero reattachment length.

<http://launchpad.net/fluidity>

# Launchpad

Code : Fluidity - Google Chrome

Ip Code : Fluidity

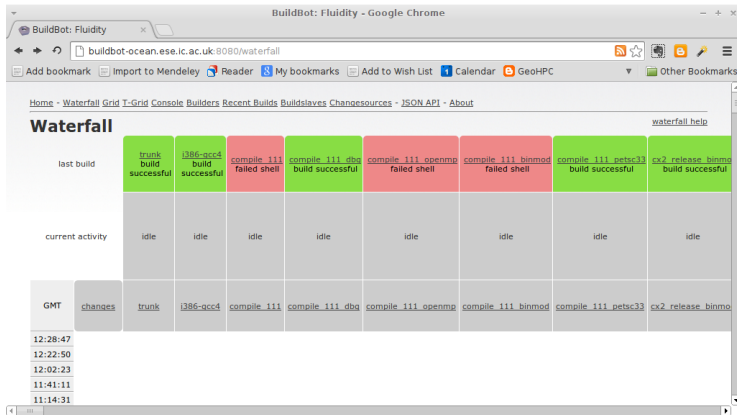
https://code.launchpad.net/fluidity

Add bookmark Import to Mendeley Reader My bookmarks Add to Wish List Calendar GeoHPC Other Bookmarks

Series: trunk			reattachment length.
lp:fluidity/4.1	Mature	2012-06-19	3858. Minor point release to 4.1.7.1 mergin...
Series: 4.1			
lp:fluidity/longtests	Development	2012-10-18	2084. Missed one.
Series: longtests			
lp:~fluidity-core/fluidity/MultiFluids_Dev	Development	18 hours ago	3968. Towards Adaptivity: continuing reengi...
lp:~fluidity-core/fluidity/pyop2	Development	20 hours ago	4132. Don't call op2.init unless we see a U...
lp:~wence/fluidity/use-options-tree-for-backend-selection	Development	20 hours ago	4132. Don't call op2.init unless we see a U...
lp:~amcg-stokes/fluidity/stokes_combination	Development	21 hours ago	4017. Merging in parallel fix for velocity...
lp:~amcg-stokes/fluidity/velocity-fieldsplit	Development	21 hours ago	4114. Make fieldsplit work in parallel. Int...
lp:~ctjacobs-multiphase/fluidity/les-extend-and-fix	Development	2012-11-02	4113. Added a 3D test case to validate the ...
lp:~amcg-stokes/fluidity/combo_remove_rotation	Development	2012-11-01	4017. Merge stokes combo updates (fieldspli...
lp:~fluidity-core/fluidity/fldecomp_renumbering	Development	2012-11-01	4112. Adding Hilbert SFC reordering from Zo...
lp:~fluidity-core/fluidity/s3backe	Development	2012-11-01	4049. Merged in newest

<http://launchpad.net/fluidity>

# Buildbot



<http://buildbot-ocean.ese.ic.ac.uk:8080/waterfall>

## Configure

Set up compile-time options, such as:

- ▶ External non-LGPL libraries
- ▶ Non-standard library locations
- ▶ Compiler flags
- ▶ Debugging

```
cd fluidity  
./configure --help
```

# Configure

Before configuring:

```
module load petsc-gcc4
```

```
./configure --enable-2d-adaptivity
```

# Python

```
export PYTHONPATH=$PYTHONPATH:/data/fluidity/python
```

# Running Fluidity

bin/fluidity

# Building

```
make -j 4  
make fltools
```



# Tests

```
make unittest  
make test  
make mediumtest
```

## Installing

```
make install  
make install-diamond  
make install-user-schemata
```

## Debian packaging

```
sudo apt-add-repository -y ppa:fluidity-core/ppa  
sudo apt-get update  
sudo apt-get -y install fluidity
```

## Updating

```
bzr up
```

```
M preprocessor/Populate_State.F90
```

```
bzr status
```

```
bzr status -SV
```

```
bzr diff filename
```

## Linux commands

- ▶ Change directories: `cd directory/another/..`
- ▶ Make directory: `mkdir directory`
- ▶ List contents: `ls ., ls -l directory`
- ▶ Look at a text file: `more file`